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APPLICATION NUMBER: 60/548,549

FILING DATE: February 27, 2004

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15750 U.S. PTO

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## PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. EL726087581US

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Additional Inventors are being named on the PG. 2 separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages 7					
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<input type="checkbox"/> Other (specify)					
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[Page 1 of 2]

Respectfully submitted,

SIGNATURE

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Date FEBRUARY 27, 2004

REGISTRATION NO. 42,859

(if appropriate)

Docket Number: ASM03292PRV

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Docket Number ASM03292PRV

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In the application of )

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Serial No. )

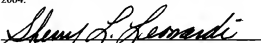
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**TRANSMITTAL SHEET**

Enclosed are the following documents:

Request for Provisional Application for Patent

Provisional Patent Application (7 pages)

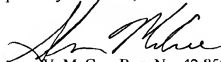
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## TIRE LABELING SYSTEM

### RELATED PATENT APPLICATIONS

5 None.

### TECHNICAL FIELD

10 In general, the present invention relates to a tire labeling system. More particularly, the present invention relates to a tire labeling system that picks up a label from a printer moves to a selected position, and applies the label to a tire.

### BACKGROUND OF THE INVENTION

15 Tire labels are applied to all new tires and contain information about the tire's characteristics and other information required by law. To save costs, large quantities of labels are printed on rolls that are sent to manufacturing facilities to be applied to the tires. The preprinted labels are loaded into a labeling machine located adjacent to a conveyor. As tires travel on the conveyor, they are brought into contact with a label at a point where  
20 the backing has been stripped away from the label allowing the label to be applied by contacting the tire to the exposed adhesive on the label.

As new performance data becomes available that affects the characteristics listed on the labels, new labels must be printed and shipped to the manufacturers and dealers to update those tires that had previously been labeled. The old label must be removed, and,  
25 due to the strong adhesive used to make sure the label does not come off during shipment, it is often difficult to completely remove the label before applying a new one.

At times, test data will become available that affects the characteristics of the tire listed on the label before the previously sent labels have been applied. In these cases, entire shipments of labels are scrapped. When viewed in the context of the extremely large  
30 number of tires produced and sold, the cost of replacing labels and scrapping old labels becomes significant, and may be on the order of millions of dollars.

Consequently, there is a need for a tire labeling system that can provide the printed information on the label on a per label basis. There is a further need for a tire labeling

system that may be used to apply labels in an automated fashion.

## SUMMARY OF THE INVENTION

5 It is, therefore, an object of the present invention to provide an improved tire labeling system.

## BRIEF DESCRIPTION OF THE DRAWINGS

10 For a complete understanding of the objects, techniques and structure of the invention, reference should be made to the following detailed description and accompanying drawings wherein:

Figure 1 is a schematic perspective view of a tire labeling system according to the concepts of the present invention with the applicator assembly removed;

15 Figure 1A is a schematic perspective view similar to Figure 1 with the applicator assembly shown detached from the positioning assembly of the tire labeling system;

Figure 2 is a top plan view of a tire label system according to the concepts of the present inventions depicting a central printer feeding a pair of applicators.

20 Figure 3 is a front elevational view of a tire labeling system according to the concepts of the present invention schematically depicting movement of the applicator from a pick-up position to an apply position, where the head of the applicator contacts the tire to apply the label thereto;

Figure 3A is a front elevational view similar to Figure 3 with the printer assembly removed;

25 Figure 3B is a right side elevational view of the tire labeling system shown in Figure 3A;

Figure 4 is an enlarged top elevational view of the applicator assembly;

30 Figure 5 is a partially fragmented enlarged side elevational view of the area circled in Figure 4 depicting the pivot arm on which the head is mounted in chain lines and showing the upward extending and downward extending apply positions of the arm and its engagement with offset bumpers that account for the off center position of the arm relative to its pivot axis;

Figure 6 is a partially sectioned front elevational view of the head depicting details

of the vacuum channels form therein and openings to which the vacuum is applied to pick-up labels from the printer;

Figure 6A is an enlarged view of the area circled in Figure 6 depicting details of a label pick-up opening formed on the head;

5        Figure 7 is a left side elevational view of the head;

Figure 8 is a right side elevational view of the head showing details of the attachment of vacuum lines to the head;

Figure 9 is an enlarged perspective view of an alternate head assembly;

10       Figure 10 is an enlarged sectional front elevational view of the alternate head assembly depicted in Figure 9;

Figure 11 is an enlarged sectional front elevational view similar to Figure 10 showing additional details of a head assembly having a screen surrounding a vacuum chamber formed in a head assembly and adapted to apply a vacuum to the screen for picking up labels;

15       Figure 12 depicts an alternate pivot bar and motor assembly incorporating pillow block bearings for movement of the arm between the apply and pick-up positions;

Figure 13 is an enlarged top elevational view of the printer assembly according to the concepts of the present invention with the head shown, (in broken lines) in the apply position;

20       Figure 14 is an enlarged top elevational view of the printer base;

Figure 14A is a sectional view as might be seen along line A-A in Figure 14 depicting further details of the printer base; and

Figure 15 is a sectional side elevational view of an area circled in Figure 14A depicting details of the stripper bar on the printer assembly.

25

#### DETAILED DESCRIPTION OF THE INVENTION

A tire labeling system according to the concepts of the present invention is generally indicated by the numeral 10 in the accompanying drawings. Tire label system 10  
30 may include a printer assembly, generally indicated by the numeral 1 that includes a printer 2 connected to a computer, generally indicated by the numeral 3, that provides the tire information 4 to the printer 2. Computer 3 may be any device suitable for storing the tire information 4 for tires T and providing that information to the printer 2. The tire



information 4 may be loaded on to computer 3 by any known method including portable memory storage devices, such as floppy disks, compact disks, portable hard drives, and the like, by a network connection with an appropriate database, or based on input from any manual or automated scanning device that reads tire information 4 off the tires T. It will be appreciated that the printer 2 and computer 3 may be integrated into a single unit. Since such devices are well known, the printer 2 and computer 3 are generically represented by boxes in the accompanying drawings. As shown, the printer 2 and computer 3 are in electrical communication to allow transmission of the tire information 4 from the computer 3 to the printer 2. The computer 3 will also be provided with the position of the individual tires T within a stack to allow the application of a label L to a specific tire T, as will be described more completely below.

The tire information 4 is transmitted to the printer 2 and then printed on a per label basis. In other words, the label L is printed just before it is applied to the tire T. In this way, if tire characteristics change that require information on the label to be changed, the computer 3 may be updated and new labels printed without having to scrap an entire roll of labels.

The printer 2 may be mounted on a printer frame 5 that has a platform 6 where the backing B is removed from the label L exposing the label's adhesive side. In the example shown, the backing B is directed downwardly from the edge 7 of the platform 6 and connected to a take-up spool 8 on which the empty backing B is gathered. As the backing B extends downward from the edge 7, the label L is at least partially freed from the backing, such that it may be picked-up by an applicator, generally indicated by the numeral 30, as will be described more completely below.

Applicator 30 is mounted on a frame, generally indicated by the numeral 15, and made moveable to transfer labels L from the printer assembly 1 to the tires T.

The frame 15 may be mounted on adjustable feet 12 that may be used to level the system 10. As will be explained in more detail below, applicator 30 may be made movable along plural axes, for example, the x, y, and z axes shown. The labeling of these axes in the drawings is arbitrary and, thus, should not be considered limiting, when considering the applicator's movement relative to frame 15. To provide for such movement, the frame 15 includes guides 16, 21, 26, described more completely below, that allow movement along the x, y, and z axes respectively.

A first guide 16 may extend perpendicular to a label path P and provides for

movement of the applicator 30 along the x-axes. A cross member 17 is slidably supported on guide 16 and carries a post 18 on which the applicator 30 is mounted. In this way, the applicator 30 may be moved toward the labels L or tires T along guide 16. The guide 16 may be any member adapted to permit movement of the cross member 17 in a direction perpendicular to the label path P. For example, guide 16 may include tracks, rails, grooves, linear tables, or shafts, among others. In the example shown, guides 16 are rails having a generally cylindrical bearing surface 16a on which a pair of slides 19 are received. The slides 19 extend downwardly from the cross member 17 defining a semicircular recess 19a that fits over guides 16.

The cross member 17 may be movable, in the Y direction. To that end, the cross member 17 may be provided with a second guide 21 similar to guide 16. It will be appreciated that the variety of guides described above may be used to the same effect to allow movement of the cross member 17 along the Y axes. In the example shown, the guide 21 is a linear table generally makes up the cross member 17. Thus, the post 18 is moveable in the X and Y direction on first and second guides 16 and 21.

The post 18 extends upwardly from the cross member 17 and may be centered thereon, as shown. The post 18 includes a vertical front surface 22 that extends parallel to the Z axes. When post 18 is a relatively thin member, suitable gussets 24 may be provided to support the post 18 along its height. A carriage 25 may be supported on post 18 and be movable, in the Z direction, to selected positions. As in the previous embodiments, a guide, in this case third guide 26, may be provided for the movement of the carriage 25. In the example shown, the third guide 26 is a linear table.

Movement of the cross member 17, post 18 and carriage 25 may be effected by various actuators including pneumatic, hydraulic, belt, servo, screw, or other drives. In the example shown, first, second, and third servo motors 27, 28, 29 are used to drive screws that position the applicator 30 in the X, Y and Z directions respectively. In particular, first servo motor 27 drives cross member 17 on guide 16 in the X direction; second servo motor 28 drives the cross member 17 in the Y direction; and third servo motor 29 moves the carriage 25 in the Z direction. As a result, applicator 30 may be moved to pick up labels L on one side and transport them in the X direction toward the tire T and then move in the Y and Z directions to locate the labels L adjacent to the appropriate tire T, within a stack S, and finally move in the X direction to apply the labels L to the tire T.

To pick up the labels L, applicator 30 is provided with a head, generally indicated

by the numeral 31, that may be moved from a pick up position (solid line) oriented parallel to the label path P, which may be horizontal, as shown, and move to an apply position 31' parallel to the tread of tire T to apply the label L to tire T. In the example shown, tires T are stacked vertically, and thus, the head 31 may be oriented vertically to apply labels L.

5 As depicted in the drawings, the head 31 may be rotated to either an upward or downward extending apply position 31' (broken lines).

The applicator 30 may include a bracket 32 that attaches to the carriage 25. The bracket 32 may be of generally the same width as the post 18, and the head 31 may be mounted on a lateral side 33 of bracket 32 outward of post 18, such that, the post 18 does

10 not inhibit the rotational movement of the head 31. As shown, head 31 is mounted on an arm 34 that rotates on a pivot shaft 35 to move the head 31 between the pick up and apply positions.

As best seen in Figure 4, the pivot shaft 35 is driven by a motor 36, which may be a servo motor. A coupling 37 may be provided to attach the pivot shaft 35 to the motor

15 36. To absorb counter-torque on pivot shaft 35 caused by the head 31 contacting tire T, coupling 37 may be a spring coupling. Pivot shaft 35 is rotatably received, for example, within bushings or bearings 38 mounted on the bracket 32.

Pivot shaft 35 is keyed or otherwise rotatably fixed to arm 34. Rotation of pivot shaft 35 by motor 36 results in rotation of the arm 34. In this way, head 31 may be rotated

20 to the pick up and apply positions. Stops 39 may be provided on bracket 32 to stop the arm 34 as it rotates the head 31 to the apply positions 31'. As shown, stops 39 may be offset relative to each other to account for the arm 34 being off center relative to the head 31.

To pick-up labels L, a vacuum may be applied at head 31 to draw the label L from

25 its backing B and on to the head 31. As best shown in Figures 6 and 6A, head 31 may be provided with one or more openings 40 along its outer surface 41. Opening 40 may be generally cylindrical and, as shown in Figure 6A, may flare radially outward at surface 41. Openings 40 may be provided along a portion of surface 41 that corresponds to the length of the label L. While individual openings 40 may be formed in head 31, the head 31 may

30 be provided with a screen (40' Figures 10 and 11) that allows a vacuum to be drawn therethrough. The head 31 is connected to a vacuum source (not shown), as by vacuum lines 43, 44. To help pull the label L from the backing B, the vacuum may be initially limited to the leading portion 40A (Figure 7) of the openings 40 and then progressively

spread to the downstream openings 40B as the label L is rolled on to the head 31. To that end, head 31 is rotatable on an axis H and a motor 45 is provided to rotate the head 31. Rotation of the head 31 may be limited to the length of the label L. Head 31 may be rotated at a speed that corresponds with the speed of the label L as it exits the printer 2. L is peeled from the backing B, the backing B may be gathered on a pick-up roller 8.

With reference to Figures 13-18 as the head 31 picks up label L, the backing B is peeled away on the bottom and the adhesive side of the label L is exposed and faces outward relative to the head 31. It will be appreciated that it may be desirable to apply additional adhesive 49 to the label L. To that end, an adhesive dispenser, generally indicated by the numeral 50 may be provided. In the example shown, the adhesive dispenser is mounted on the printer frame 5 and located inward relative to the printer 2, such that additional adhesive may be applied to the label L after it is picked up by the head 31. A number of dispensers are available in the art and any of which may be used. In the example shown, the adhesive dispenser 50 is a adhesive sprayer.

With the label L on the head 31, the applicator moves along the x, y, and z axes according to instructions from computer 3 to position the label L adjacent the selected tire T. With the head in the apply position, the applicator 30 is advanced toward the tire T to press the head 31 against the tire sandwiching the label L therebetween. The applicator 30 detects the force at the head 31, for example, by a torque limit programmed into motors 27, 28 or 29 to avoid over extending head 31. This ensures the motors are not damaged. As necessary, after the label L is initially contacted with tire T, the head 31 may be moved along the tire's surface to completely apply the label L to the tire T. During this process, the vacuum is released freeing the label L from the head 31. After the label L is applied, the applicator 30 moves to the printer 2 to repeat the pick-up and apply process.

In light of the foregoing, it should thus be evident that a tire labeling system according to the concepts of the present invention substantially improves the art. While, in accordance with the patent statutes, only the preferred embodiment of the present invention has been described in detail hereinabove, the present invention is not to be limited thereto or thereby. It will be appreciated that various modifications may be made to the above-described embodiment without departing from the spirit of the invention.

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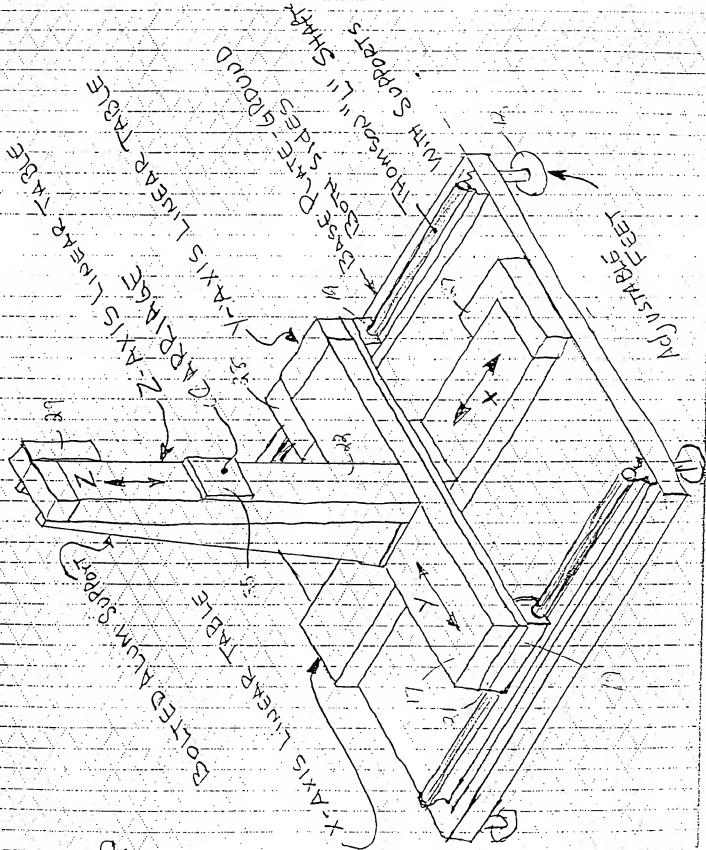


FIG. 1

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FIG. 2

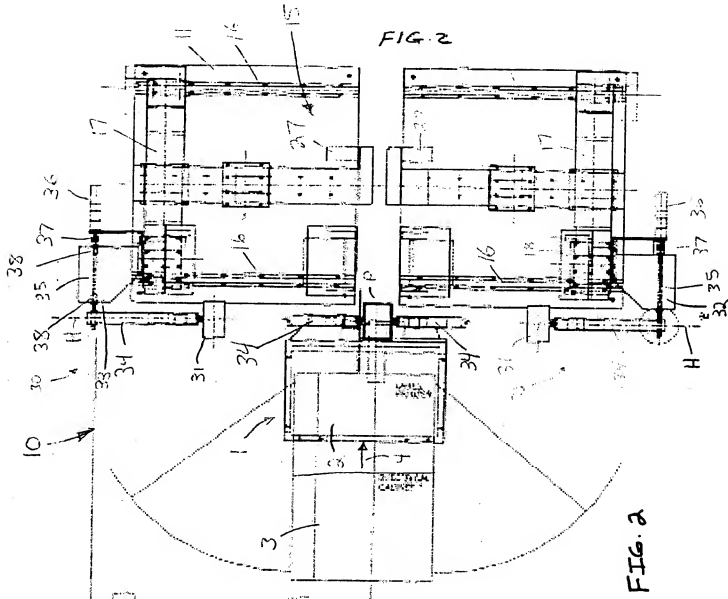


FIG. 2

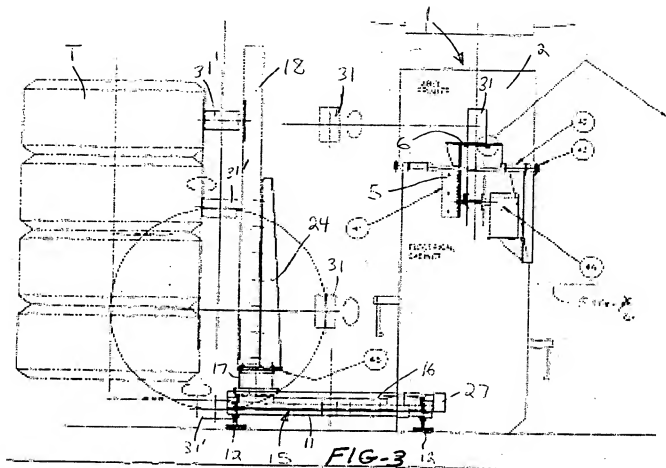


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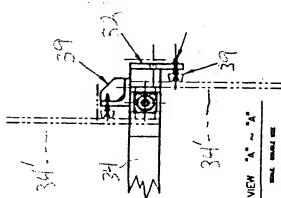
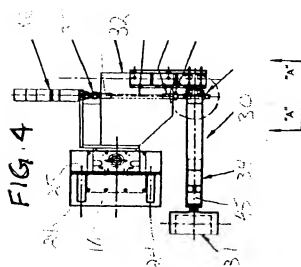


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**FIG. 5**

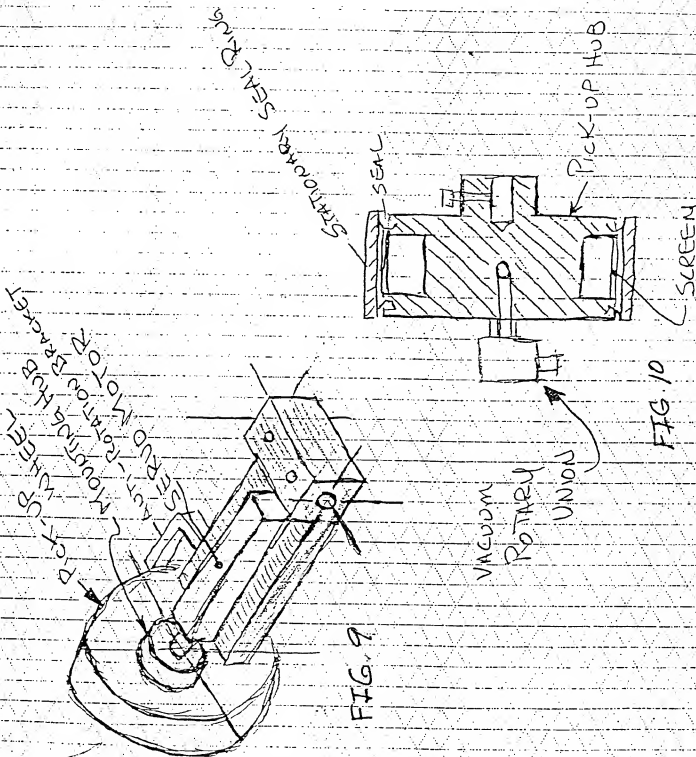
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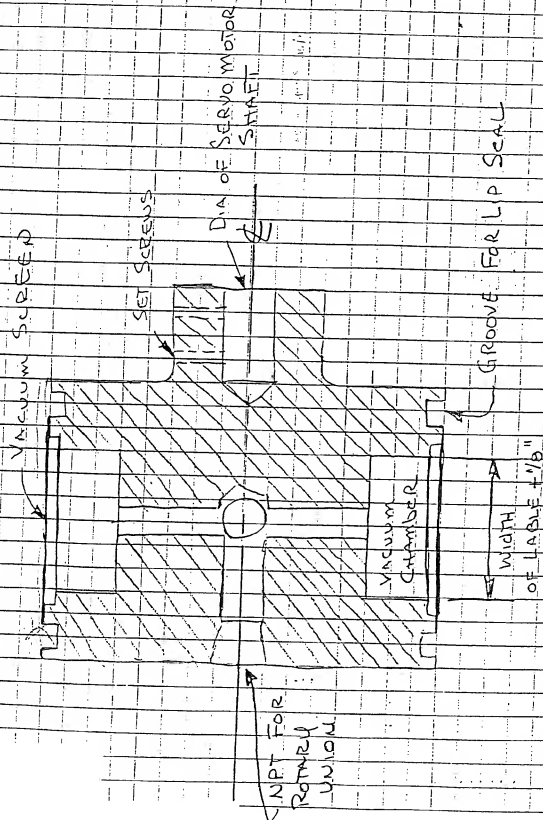
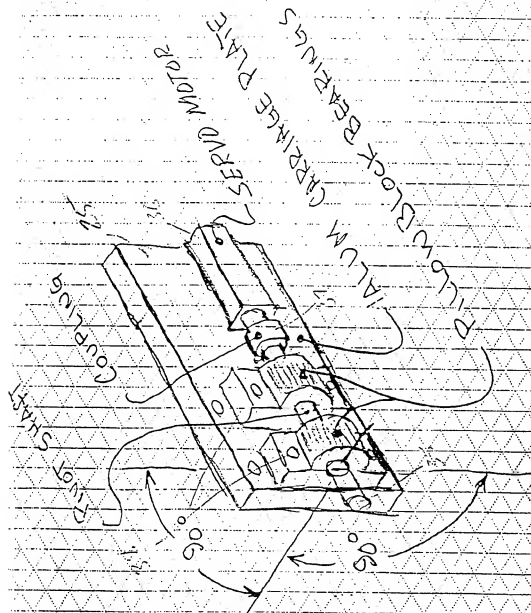


FIG. 11  
PICK-UP HUB

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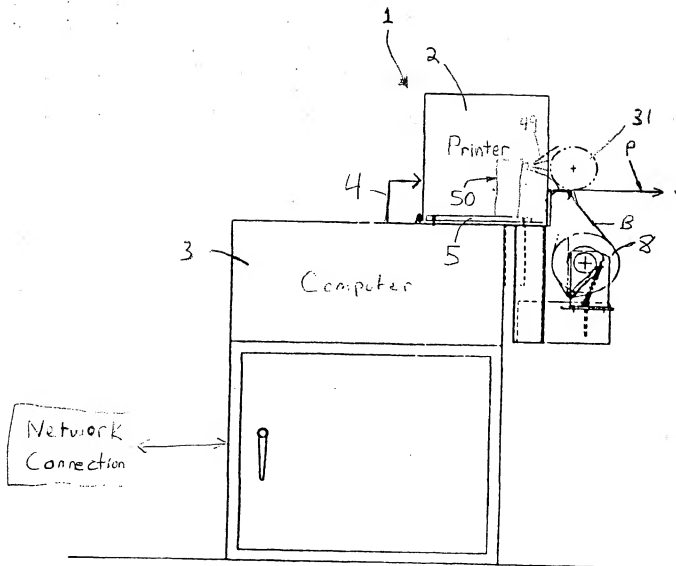


FIG. 13



